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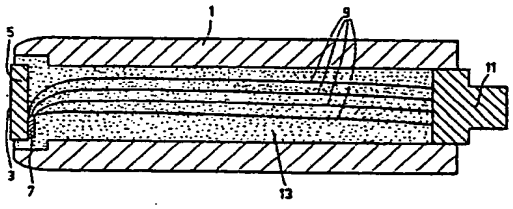
(54) Temperature sensor.

(57) A temperature sensor comprising a tubular holder (1) at least the front part of which is filled with an insulating, flexible compound (13) in which a support (5) is embedded so that a contact face (3) of the support which is situated at the front of the temperature sensor, is not covered by the compound. On the support there is arranged a temperature-sensitive element (7) to which connection wires (9) are connected which extend through the flexible compound. This construction offers the advantage that the temperature-sensitive element readily and accurately assumes the temperature of a surface to be examined when the contact face is pressed thereagainst.



EP 0 062 936 A1

"Temperature sensor".

The invention relates to a temperature sensor comprising a tubular holder at the front end of which there is situated a contact face which forms part of a support which is connected to the holder and on which there is arranged a temperature-sensitive element to which connection wires are secured which extend through the interior of the holder.

Temperature sensors of this kind are used for measuring the surface temperatures of objects. To achieve this, the contact face is pressed against the relevant surface. The temperature sensitive element may be, for example, a platinum resistor whose resistance is measured by means of a suitable measuring instrument via the connection wires. Because this element is arranged on the support so that it is remote from the contact face, damage during measurement is prevented. If the support is made of an insulating material, it also prevents conductive contact between the temperature-sensitive element and voltage-carrying surfaces during a measurement of the temperature of such surfaces.

It is a drawback of known temperature sensors of the kind set forth that a part of the heat flow from the surface to be examined is dissipated via the support and the holder, so that it does not reach the temperature-sensitive element. Consequently, a comparatively long period of time is required before the element reaches its ultimate temperature, and the measurement is also less accurate. This effect is even more significant when the temperature sensor is pressed against a surface to be examined having a slightly different attitude, so that only part of the contact face rests firmly against the object surface.

It is an object of the invention to provide a temperature sensor in which the contact face is automatically

correctly arranged against the surface to be examined, and in which the heat flow from the contact surface to the holder is negligibly small. To achieve this, the temperature sensor in accordance with the invention is characterized in that at least that part of the interior of the holder which adjoins the front end is filled with a thermally insulating, flexible compound in which the support is embedded so that the contact face is not covered by the flexible compound.

Because the compound is flexible, the support can adapt itself to the attitude of the surface to be examined, and because the compound is thermally insulating, the heat flow from the support to the holder is substantially reduced. The flexible compound is preferably a silicone paste.

A further reduction in the heat flow via the holder can be achieved by using a thermally poorly conductive plastics material for the manufacture of the holder.

The invention will be described in detail hereinafter with reference to the drawing which represents a longitudinal sectional view of an embodiment.

A temperature sensor shown comprises a tubular holder 1 which is made of a thermally conductive synthetic material, for example, polyphenylene sulphide filled with glass fibres. At the front end of the holder 1 (to the left in the Figure) there is situated a contact face 3 which forms part of a support 5 on which a temperature-sensitive element 7 is accommodated. The temperature-sensitive element 7 consists of, for example, a platinum resistor and is connected, via four connection wires 9, to a connector 11 arranged on the rear end of the holder 1. Via this connector, the temperature sensor can be connected to a suitable measuring instrument.

The support 5 should have a small thermal capacity and should be suitably thermally conductive in order to enable the temperature-sensitive element 7 to be heated rapidly. To achieve this, the support 5 is made of, for example, a plate of aluminium oxide dimensioned 2 x 2.3 mm with a thickness of 0.25 mm.

The interior of the holder 1 is filled with a thermally insulating, flexible compound 13, for example, a silicone paste. The support 5 is embedded in the compound so that the contact face 3 is not covered by the compound and preferably projects a small distance (for example 0.1mm) from the exterior surface of the compound. Because the compound 13 is flexible, the support 5 is slightly movable with respect to the holder 1, so that the contact face is always suitably arranged against a surface to be examined, even when the longitudinal axis of the temperature sensor is not ecactly perpendicular to this surface. A second function of the compound 13 is to retain the connection wires 9, so that the connections between these connection wires and the temperature-sensitive element 7 are strain-relieved.

As a result of the thermal insulating properties of the compound 13 and the holder 1, hardly any heat is transported between the support 5 and the environment via the holder. Consequently, and due to the high thermal conductivity of the support 5, the temperature-sensitive element 7 is quickly heated when the temperature sensor is pressed against a warm surface by way of the contact face 3 which is movable with respect to the holder. The connection wires 9 are chosen to be as thin as possible and, moreover, comparatively long, so that only very little heat is dissipated to the connector 11 via these wires.

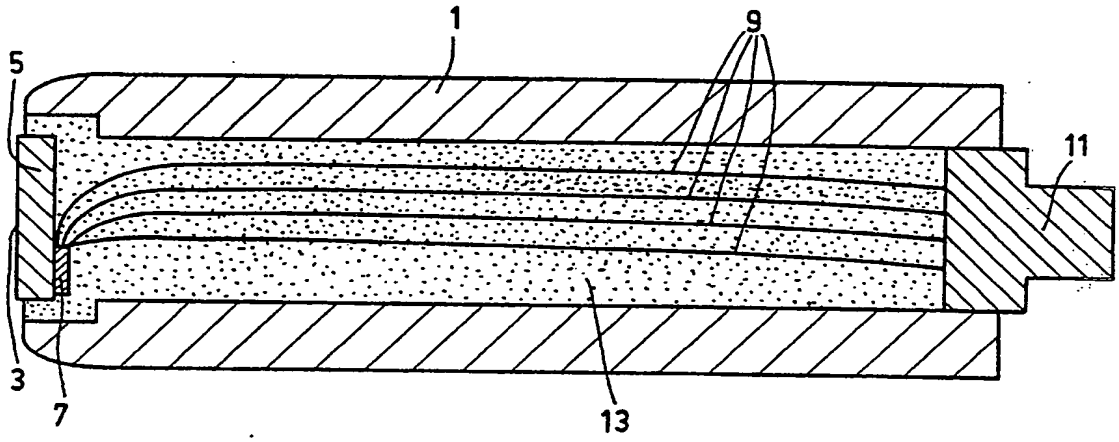
Several variants of the described embodiment are possible. For example, the temperature - sensitive element 7 may be a thermistor or a thermo-couple. Moreover, the compound 13 may alternatively fill only the front part of the interior of the holder 1. Instead of being fed out via the connector 11, the connection wires 9 may be directly fed, for example, to a connection cable at the rear of the temperature sensor.

CLAIMS

1. A temperature sensor, comprising a tubular holder (1) at a front end of which there is situated a contact face (3) which forms part of a support (5) which is connected to the holder and on which there is arranged a temperature-sensitive element (7) to which connection wires (9) are secured which extend through the interior of the holder, characterized in that at least that part of the interior of the holder (1) which adjoins the front end is filled with a thermally insulating, flexible compound (13) in which the support (5) is embedded so that the contact face (3) is not covered by the flexible compound.

2. A temperature sensor as claimed in Claim 1, characterized in that the flexible compound is a silicone paste.

3. A temperature sensor as claimed in Claim 1 or 2, characterized in that the holder (1) is made of a thermally poorly conductive plastics.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EUROPEAN SEARCH REPORT

Application number
EP 82 20 0316

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
X	US-A-4 133 208 (C.A.PARLANTI) *Introduction; figures 2,4,5,6,7; column 2, lines 10-49; line 55 - column 3, line 28*	1,2	G 01 K 1/14 G 01 K 1/16 G 01 K 7/00
X	US-A-4 186 368 (P.M.WHITE) *Summary; column 2, lines 20 - column 3, line 61; figures 1,2,3*	1-3	
X	US-A-3 878 728 (L.A.MARZETTA) *Figures 4,5; column 6, line 61 - column 8, line 16*	1-3	

TECHNICAL FIELDS SEARCHED (Int. Cl. ³)

G 01 K 1

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	03-08-1982	VISSER F.P.C.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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